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PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MOHAMMAD M. SAMII

Appeal 2007-2090
Application 10/634,424
Technology Center 2800

Decided: January 28, 2008

Before JOHN C. MARTIN, JOSEPH L. DIXON, and
LANCE LEONARD BARRY, *Administrative Patent Judges*.
DIXON, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's Final Rejection of claims 1-14 and 23. We have jurisdiction under 35 U.S.C. § 6(b). Claims 15-22, 24, and 25 have been canceled.

We REVERSE and enter a NEW GROUND OF REJECTION.

BACKGROUND

Appellants' invention relates to photosensor activation of an ejection element of a fluid ejection device (Spec. 1). An understanding of the invention can be derived from a reading of exemplary claim 1, which is reproduced below.

1. A printhead assembly comprising:

a plurality of ejection elements, each of the ejection elements configured to cause fluid to be ejected when the ejection element is activated;

a plurality of latches; and

a plurality of junction photosensors, each junction photosensor coupled to one of the ejection elements via one of the latches, each junction photosensor configured to generate an activation signal that causes the ejection element coupled to the photosensor to be activated when the photosensor is illuminated by a light source.

PRIOR ART

The prior art references of record relied upon by the Examiner in rejecting the appealed claims are:

| | | |
|--------|--------------|---------------|
| Maru | US 5,877,784 | Mar. 2, 1999 |
| Fujii | US 5,053,789 | Oct. 1, 1991 |
| Sueoka | US 6,024,439 | Feb. 15, 2000 |
| Tamura | US 4,794,463 | Dec. 27, 1988 |

Millman, Microelectronics, Second Edition, McGraw-Hill, Inc., 133-135 (1987).

REJECTIONS

Claims 1-4, 10, 13-14, and 23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Maru in view of Fujii.

Claims 5-8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Maru in view of Fujii, as applied to claim 4, and further in view of Millman.

Claims 11-12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Maru in view of Fujii, as applied to claim 1, and further in view of Sueoka.

Claim 9 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Maru in view of Fujii, as applied to claim 1, and further in view of Tamura.

Rather than reiterate the conflicting viewpoints advanced by the Examiner and the Appellant regarding the above-noted rejection, we make reference to the Examiner's Answer (mailed Oct. 19, 2006) for the reasoning in support of the rejections, and to Appellant's Brief (filed Jun. 30, 2006) and Reply Brief (filed Dec. 14, 2006) for the arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to Appellant's Specification and claims, to the applied prior art references, and to the respective positions articulated by Appellant and the Examiner. As a consequence of our review, we make the determinations that follow.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. See *In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988). In so doing, the Examiner must make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). "[T]he Examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a *prima facie* case of unpatentability." *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). Furthermore, "'there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness' . . . [H]owever, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007)(quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

Appellant argues that the Examiner's analysis ignores words used in independent claims 1 and 23 (Reply Br. 2). Appellant points out that independent claim 1 recites "a plurality of latches; and a plurality of junction photosensors, each junction photosensor coupled to one of the ejection elements via one of the latches" and that independent claim 23 recites "a junction photosensor coupled to the ejection element via a latch and a multi-transistor amplifier" (*id.* at 3). Appellant contends that Maru and Fujii do not individually or collectively teach or suggest these limitations (*id.*).

The Examiner held that the artisan would have been motivated to replace Maru's shift register 105 with Fujii's array of photodiodes in order "to avoid the many problems due to wiring connection such as disconnection, short circuit, or attenuation (due to resistance of the wiring)" (Answer 4). We find this stated motivation for combining the teachings of Maru and Fujii in the manner described to lack sufficient specificity with respect to combining the reference teachings in the manner proposed by the Examiner. Finding no convincing line of reasoning for the combination of elements in the specified orientation as recited in independent claim 1 and independent claim 23, we cannot sustain the rejection of those claims or dependent claims 2-4, 10, 13, and 14, which also stand rejected over Maru in view of Fujii.

Additionally, we do not find that the teachings of Millman, Sueoka or Tamura remedy the deficiency in the base combination as discussed above, and we will not sustain the rejections of dependent claims 5-9, 11, and 12.

NEW GROUND OF REJECTION OF CLAIMS 1 AND 23

We reject claims 1 and 23 under 35 U.S.C. § 103(a) as being obvious over Maru and Fujii based on a specific motivation not argued by the Examiner. While we could affirm the Examiner's rejection based upon the same references on a different motivation, we are characterizing the rejection as a new ground of rejection to allow Appellant to respond to the modified rationale for the combination and the additional factual findings presented below.

Maru's Figure 11, upon which the Examiner relies, depicts what Maru characterizes as a conventional ink-jet printhead (IJH in Fig. 1), which employs a plurality of electrothermal transducers (heaters) 101 as the ink ejection elements (col. 1, ll. 12-14 and 28-29). Shift register 105 stores serially inputted data indicating whether or not to activate the respective transducers (col. 1, ll. 26-29). In response to a latch timing signal (LATCH) applied to terminal 203, the data is transferred in parallel from the shift register stages to respective latches 104 (col. 2, ll. 2-4). A time-divisional logic circuit 103 is responsive to a heater-enable signal (H.ENB) applied to terminal 204 and to a selection signal (SEL) applied to terminal 205 to activate selected groups of transducers in succession (col. 1, ll. 21-24, 36-38, and 46-52).

In the Figure 11 printhead, the number of shift register stages (N) is equal to the number of latches, which is equal to the number of transducers. This configuration is undesirable because “the shift register and the latches occupy large space on the circuit board, thus preventing downsizing of the circuit board and reduction of production costs” (col. 2, ll. 25-29).

The first embodiment of Maru’s invention, depicted in Figure 3, replaces the N-stage shift register of the Figure 11 embodiment with a logical circuit 109 and a shift register having N/2 stages (col. 6, ll. 16-19). The second embodiment, depicted in Figure 8, employs fewer latches (112a-112d) than transducers (col. 9, ll. 56-59).

Maru also explains that the printhead can take the form of “a full line type printhead having a length corresponding to the width of a maximum printing medium which can be printed by the printer” (col. 10, ll. 49-51).

Comparing claim 1 to Maru’s Figure 11 (prior-art) printhead, the recited “plurality of ejection elements” read on transducers 101 and the recited “plurality of latches” read on latches 104, as found by the Examiner (Answer 3). As explained by the Examiner, Maru’s Figure 11 does not include the recited “plurality of junction photosensors.”

Fujii discloses a printer using an optically-switched thermal printhead 3 that includes a row 3b of heating elements H coupled to a row 3a of respective photodiodes through respective switching transistors Tr. As shown in Figure 1, the row of heating elements extends the entire width of the page and rotating mirror 2 causes the modulated laser beam to scan the

row of photodiodes in succession. When a photodiode D is irradiated by the laser beam, the associated transistor Tr is rendered conductive, energizing the associated heater H (col. 2, ll. 54-57).

Fujii characterizes the printer as “based on the principle of using photoelectric switch means serving as the switch means for each heating element, and producing printing signals in the form of light” (col. 1, ll. 40-43).

The Examiner held that it would have been obvious in view of Fujii to replace shift register 105 and its input terminals 201 and 202 in Maru’s Figure 11 printer with a row of photodiodes that are sequentially scanned by a modulated laser beam. As motivation, the Examiner found that the artisan would have been desired “to avoid many problems due to the wiring connection such as disconnection, short circuit, or attenuation (due to resistance of the wiring)” (Answer 4), a motivation that we found to lack the required specificity. However, the Examiner’s finding that the artisan would have considered the wiring connections for shift register 105 and latches 104 in Maru’s Figure 11 (i.e., prior-art) printhead to be problematic finds clear support in Maru’s explanation that “the shift register and the latches occupy large space on the circuit board, thus preventing downsizing of the circuit board and reduction of production costs” (col. 2, ll. 25-29).¹

¹ Although Maru’s proposed solutions do not involve replacing the shift register with an optically scanned photodiode array, Maru does not “teach away” from such a modification. See *Para-Ordnance Mfg. v. SGS Importers Int’l*, 73 F.3d 1085, 1090 (Fed. Cir. 1995) (the Browning Hi-Power handgun does not teach away from the claimed invention; while it

The suitability of Fujii's optical switching as a solution to this problem with Maru's Figure 11 printhead would have been readily apparent when, as suggested by Maru (col. 10, ll. 49-51), the printhead is implemented as a full-line (i.e., page width) type printhead, as is the case with Fujii's printhead. That is, it would have been obvious to replace shift register 105 in the Figure 11 printhead thus implemented with a row of photodiodes and means for scanning the photodiodes with a modulated laser beam.² The latches 104 and time-divisional logical circuit 103 would be retained in order to preserve their function of activating selected groups of transducers in succession (col. 1, ll. 21-24, 36-38, and 46-52). In Maru's Figure 11 printhead modified in this manner, each photodiode would be coupled to a respective ejection element via a respective latch, thereby satisfying independent claims 1 and 23.

Thus, although Appellant is correct to point out (Reply Br. 3) that neither one of Maru and Fujii teaches "each junction photosensor coupled to one of the ejection elements via one of the latches" (claim 1), the artisan faced with the above-noted problem with Maru's Figure 11 printhead and

fails to disclose a converging frame, it does not warn a person against using convergence); *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994) ("A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.").

² Appellant is therefore incorrect to characterize the proposed modification as resulting in replacing Maru's shift register 105 with "a photodiode" (Reply Br. 6).

having knowledge of Fujii would have seen such a teaching in Maru and Fujii considered collectively.³ A reference may be understood by the artisan to be suggesting a solution to a problem not discussed in that reference. As explained in *KSR Int'l Co. v. Teleflex, Inc.*, 127 S. Ct. at 1742 (2007):

The second error of the Court of Appeals lay in its assumption that a person of ordinary skill attempting to solve a problem will be led only to those elements of prior art designed to solve the same problem. . . . Common sense teaches . . . that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle. . . . A person of ordinary skill is also a person of ordinary creativity, not an automaton.

Appellant also argues that replacing Maru's shift register with photodiodes scanned by a modulated laser beam

would drastically change the manner in which the print head disclosed in Maru operates (e.g., it would apparently no longer receive a clocked data signal on terminals 201 and 202, no longer perform a bit shifting operation, possibly no longer time divisionally control power-supply to the transducers 101), and require a major reconstruction of the print head itself, as well as the entire printer IJRA (Figure 1).

³ As additional support for replacing wired communication with optical communication, the Examiner cites the following U.S. patents: Klaus 5,396,078; Chiu 5,567,063; and Kless 6,357,859 (Answer 8-9). Because these patents (a) are not relied on in the statement of any ground of rejection and (b) are not added merely as evidence of a prior statement made by the Examiner as to what is "well-known" in the art that was challenged for the first time in the Brief, we have given them no consideration. MPEP § 1207.03 (8th ed., rev 6, Sept. 2007).

Reply Br. 6. In support of this proposition, Appellant cites MPEP § 2143.01 and *In re Ratti*, 270 F.2d 810, 813 (CCPA 1959) (reversing a § 103 rejection because “[t]his suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principles under which the [the primary reference] construction was designed to operate”). This argument is unpersuasive for several reasons. In the first place, the suggestion that Maru as modified might “possibly no longer time divisionally control power-supply to the transducers 101” is not understood. Appellant has not explained why the artisan would have thought it inadvisable to retain Maru’s time-divisional logical circuit 103 when replacing shift register 105 with a row of photodiodes. Second, as for apparently no longer receiving a clocked data signal on terminals 201 and 202 and no longer perform a bit shifting operation, the clocked data signal would be applied to the laser beam modulator, while bit shifting would effectively be performed by the scanning action of the laser beam. Apart from these changes, Maru’s latches 104, time-divisional logical circuit 103, power transistors 102, and transducers 101 would operate in the same manner as before. As a result, the proposed modifications of Maru would not change the basic principles of operation of Maru’s printhead to a degree suggesting nonobviousness under *Ratti*.

For the foregoing reasons, we reject independent claims 1 and 23 under § 103(a) for obviousness over Maru in view of Fujii and in fairness to

Appellant we designate the modified application of the prior art references as a new ground of rejection.

We have not applied the prior art to the dependent claims, and we leave it to the Examiner to evaluate the other prior art teachings in light of our prior art rejection of independent claim 1 and 23.

CONCLUSION

To summarize, we have not sustained the rejection of claims 1-14 and 23 under 35 U.S.C. § 103(a) and have entered a new ground of rejection of independent claims 1 and 23 under 35 U.S.C. § 103(a) under our authority in 37 C.F.R. § 41.50(b) (2007).

As indicated *supra*, this decision contains a new ground of rejection pursuant to 37 C.F.R. § 41.50(b), which provides that “A new ground of rejection . . . shall not be considered final for judicial review.”

37 C.F.R. § 41.50(b) also provides that the Appellant, *WITHIN TWO MONTHS FROM THE DATE OF THE DECISION*, must exercise one of the following two options with respect to the new ground of rejection to avoid termination of the appeal as to the rejected claims:

(1) *Reopen prosecution*. Submit an appropriate amendment of the claims so rejected or new evidence relating to the claims so rejected, or both, and have the matter reconsidered by the examiner, in which event the proceeding will be remanded to the examiner. . . .

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(2) *Request rehearing.* Request that the proceeding be reheard under § 41.52 by the Board upon the same record. . . .

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

REVERSED-37 C.F.R. § 41.50(b).

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